

uniform fuel distribution, in turn, requires total vaporization of the fuel in the carburetor..." Col. 3 lines 34, 35). Kopa further states "The present invention provides a carburetor which is further improved in the same areas, to wit, in the areas of total fuel vaporization..." (Col. 4 lines 5 - 8) and "the cyclonic flow inductor is effective to (1) drive the unvaporized fuel droplets in the air-fuel mixture outwardly, by centrifugal action, against the walls of the carburetor housing which are heated to affect total vaporization of the fuel in the carburetor..." (emphasis added). Kopa thus cannot provide a "fog of fuel droplets of a maximum predetermined size to said apparatus...". It is evident that, as the Examiner correctly states, Kopa does not envision or encompass anything other than "total vaporization of the fuel". This is in contrast to Applicant's claim 1, which provides "a fog of fuel droplets of a maximum predetermined size". In fact, it is respectfully submitted that the carburetor of Kopa, constructed to use centrifugal force to throw any fuel droplets against a heated wall, is incapable of providing any "fuel droplets" whatsoever "to apparatus to for utilizing energy produced from burning said liquid fuel" (claim 1). Further, Applicant's claim 1 provides "a closed liquid fuel fog-producing device...". In contrast, the injector 54 of Kopa receives air through inlets 36 (Col. 7 lines 15 - 17, Figs. 1, 2, 4) and thus it is not "closed. Please see MPEP 2143, "the prior art reference (or references when combined) must teach or suggest all the claim limitations". Further, the reference to Kopa strongly "teaches away" from use of fuel droplets. Please see MPEP 2144.05 III, "a *prima facie* case of obviousness may also be rebutted by showing that the art, in any

material respect, teaches away from the claimed invention". Further yet, any effort to cause the reference to Kopa to provide "a fog of fuel droplets" would render it in operative for its intended purpose and changes principle of operation. Please see MPEP 2143.01 V, "if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make proposed modification", and MPEP 2143.01 VI, "if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified then the teachings of the references are not sufficient to render the claims *prima facie* obvious".

The reference of Wisman also teaches the desirability of complete vaporization of fuel wherein "Atomization of a liquid into a finely divided spray or fog does not in itself constitute a transition to the gaseous phase capable of molecular admixture with oxygen which is the necessary prerequisite for combustion. The discrete fog particles remain liquid albiet finely divided but of aggregate volume identical to the original three-atomization liquid." Col. 1 lines 49 - 56). It is respectfully submitted that Wisman also strongly "teaches away" from use of fuel droplets, even in the form of a fog. Please see MPEP 2144.05 III as applied above. The operation of Wisman also involves placing a homogenizer plate having a non-wettable surface just below a carburetor. Such non-wettable surface is also provided on a throttle plate of the carburetor. Further, a portion of the intake manifold below and downstream from the carburetor is provided with such non-wettable surface.

It is respectfully submitted that there is absolutely no motivation or suggestion to combine the references of Kopa and Wisman. The reasoning for this is that processing of the fuel in Wisman occurs primarily after the carburetor. At this point, as noted above fuel from the carburetor of Kopa is already completely vaporized. The structure of Wisman would then serve no purpose and have no function whatsoever. Please see MPEP 2143.01, "obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so" and "the proper inquiry is "whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness of making the combination". The Office further states "Wisman teaches the well-known use of a fog producing device in a fuel delivery system creating fuel droplets of about 25.4 microns in size for the purpose of assuring maximum fuel-air mixing...", and cites Col. 1 lines 10 - 71. However, a careful reading of this discussion of Wisman reveals that here, Wisman is merely expounding upon a scientific principle related to vaporization and exposed surface area of variously sized droplets. Nothing in this discussion, or anywhere else in the reference to Wisman, indicates that these sized droplets are actually produced. As such, Wisman does not teach, suggest or infer production of "a fog of fuel droplets of a maximum predetermined size" as provided in Applicant's claim 1. Rather, like Kopa, Wisman teaches away from burning fuel droplets, stating "fuels in liquid form will not burn but must first be vaporized...". Please see MPEP 2144.05 III as applied above.

Independent claim 13 similarly provides " a liquid fuel, size limited droplet-producing device coupled to receive said metered qualities of said liquid fuel and deliver a stabilized fog of liquid fuel droplets having a maximum predetermined size to said induction airflow", "a housing enclosing said fuel metering device and said liquid fuel, size limited droplet-producing device into a single, discrete component" and "whereby when said stabilized fog of liquid fuel droplets having a maximum predetermined size are ignited in said combustion region...". It is respectfully submitted such structure and function is not found, taught or suggested by the reference to Kopa. The addition of Wisman to Kopa cannot cure these deficiencies as noted above. Please see MPEP 2143.01 I as applied above, 2143.01 III, "the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination", and 2143.01 IV, "it is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references".

From the foregoing, is respectfully submitted that the references of Kopa and Wisman, taken together or separately, are improper references to support this rejection. It is further respectfully submitted that this rejection be withdrawn.

Dependent claims 5 and 17-19 are rejected over Kopa and Wisman, and further in view of Smith. The reference to Smith provides a plurality of

mixing devices throughout an intake manifold in order to "facilitate the breaking up of [fuel particles] when they strike a mixing unit" and "destroy the stability of the gasoline globules or other fuel globules to facilitate their separation into smaller particles upon impact with a unit 14" (Col. 3 lines 19-30). However, as noted above the carburetor of Kopa completely vaporizes the fuel within the carburetor. As such, there is no motivation whatsoever nor any desirability of installing the mixers Smith in combination with Kopa. Please see MPEP 2143.03, 2143.01 I, III, IV as applied above. It is thus respectfully submitted that the reference to Smith is an improper reference unable to support this rejection. Is also respectfully requested that this rejection be withdrawn.

Dependent claims 6-9 and 20-22 are rejected over Kopa, Wisman and Smith, and further in view of Dourass. The reference to Dourass provides a "fuel economizer" positioned just after a carburetor outlet. Such a device, as noted above with respect to claims 1 and 13, finds no suggestion whatsoever to be combined with Kopa, which is noted effects complete vaporization of the fuel within the carburetor. Thus, the device of Dourass would be completely nonfunctional and have no desirability whatsoever when combined with Kopa. Please see MPEP 2143.01 I, 2143.01 III, and 2143.01 IV as applied above. It addition, it appears that this combination is attempted using a catalog of parts in the prior art and using Applicant's own disclosure as a guide, constituting improper hindsight reconstruction.

Moreover, the device of Dourass does not have features of claims 6-9 and 20-22. Here, Applicant's claim 6 provides "a disk having a central opening". In contrast, Dourass provides "a plate for mounting between the carburetor and the inlet manifold, with an opening in the mounting plate and a single ring of projections adapted to project from the edge of the opening into the inlet manifold, the projections being tapered and pointed and having their medial lines at two angles to the perpendicular to the mounting plate...". As seen in Figs. 1-5 of Dourass, the projections run generally parallel to the intake manifold. There is no "disk" as provided in Applicant's claim 6. Applicant's claim 7 provides that "each said disk further comprises slits extending away from said central opening". In contrast, the spaces between the projections of Dourass extend perpendicular to his opening. Further yet, as claim 6 is a composite device of claims 1, 2, 3 and 5, which provide "a closed liquid fuel fog producing device" "incorporated into a single, unitary housing communicating with an induction flow" and wherein said fog-producing device "comprises a tube having a plurality of turbulence-inducing devices therein", it is respectfully submitted that none of these features can be found in Kopa, Wisman, Smith and Douras, taken separately or together.

Applicant's claims 8 and 9 set forth composite devices including features from claims 1, 2, 3, 5, and 6, and provide "a gas reservoir coupled to said tube" and "liquid fuel is injected into an end of said tube communicating with said gas reservoir". Again, these features are not found in Kopa, Wisman, Smith and Dourass, taken separately or together.

Please see MPEP 2143, "the prior art reference "or references when combined" must teach or suggested all the claim limitations".

Claims 20-22 should be allowable for the same reasons set forth with respect to claims 6-9.

In view of a foregoing, is respectfully suggested that the combination of Kopa, Wisman, Smith and Dourass cannot be relied on to support a rejection under 35 USC 103(a). As such, it is respectfully requested the rejection to claim 6-9 and 20-22 be withdrawn.

Dependent claims 10 and 23 are rejected over the references of Kopa, Wisman, Smith, Dourass and Gagnon. The reference to Gagnon provides a fan onto which fuel is dripped, after which fuel droplets are blown by the fan into a heated chamber where the fuel is completely vaporized. Applicant's claim 10, a composite device including features of claims 1, 2, 3, 5 and 6, provides "a liquid fuel heater that causes a portion of the liquid fuel to flash into vapor when released from said liquid fuel metering device". In contrast the device of Gagnon vaporizes all the fuel and thus cannot provide a "fog of liquid fuel droplets of a maximum size to said apparatus". Further, the other provisions of claims 1, 2, 3, 5 and 6 are not found in Gagnon as noted above. Please see MPEP 2143, 2143.01 I, 2143.01 III, 2143.01 IV, 2143.01 V, and 2143.01 VI as applied above.

Claim 23 should be allowable for reasons set forth with respect to claim 10 as noted above.

In view of the foregoing, is respectfully submitted that the reference to Gagnon, when added to the references of Kopa, Wisman, Smith and Douras, does not cure of the deficiencies of the other references as noted above, or somehow separately fully teach the claim features of claims 10 and 23. Please see MPEP with respect to the rejections of claims 10 and 23 above. As such, is respectfully requested this rejection be withdrawn.

Independent claim 24 and dependent claim 25 are rejected over Kopa and Wisman, and further in view of Omarsson. The reference to Omarsson is relied on for an engine controller. However, claim 24 also provides "a liquid fuel fog-producing device in said housing, said liquid fuel fog-producing device receiving said metered quantities of said liquid fuel from said liquid fuel metering device, and processing said metered quantities of said liquid fuel into a fog of liquid fuel droplets of a maximum predetermined size". This feature is not found in the references of Kopa and Wisman as noted above. The reference to Omarsson does nothing to cure this defect. As such, features of claim 24 are not taught by the suggested combination of prior art. Please see MPEP with respect to rejections of claims 10 and 23 above

Claim 25 provides the additional feature to claim 24 wherein "said maximum predetermined size of said liquid fuel droplets is about 50 microns with said fuel droplets in said fog of liquid fuel droplets being sized predominantly in a range of from about 10 microns to about 30 microns". Since the reference to Kopa completely vaporizes the fuel within the carburetor,

the reference of Kopa cannot provide "a fog of fuel droplets". Also as noted, the addition of Wisman to Kopa would have no effect on the operation of the carburetor of Kopa, as fuel would be completely vaporized by the time it arrived at the structure of Wisman. Thus, as noted, there is no motivation to combine Kopa and Wisman, nor is there any advantage to be obtained or any beneficial result. Please see MPEP with respect to rejections of claims 10 and 23 above. In view of the foregoing, it is respectfully suggested the combination of Kopa, Wisman and Omarsson cannot be relied on in this rejection to claims 24 and 25. As such, it is respectfully requested that this rejection be withdrawn.

Claims 26 and 27 are rejected over Kopa, Wisman and Omarsson, and further in view of Smith. Claims 26 and 27 set forth a composite device including all the features of claim 24, claim 25 specifying droplet size of the "fog of liquid fuel droplets" of claim 24, and claim 26 adding the feature of "wherein said liquid fuel fog-producing device comprises a tube containing at least one turbulence-inducing device, said tube receiving said metered quantities of said liquid fuel at one end thereof and providing said fog of liquid fuel droplets of a maximum predetermined size to said induction airflow from an opposite end thereof".

This rejection still relies on Kopa as the primary reference. As such, since all fuel is vaporized within the carburetor of Kopa, the structure of Wisman and Smith are merely superfluous structure since the fuel is already vaporized by the time it reaches the structures of Wisman and Smith. Thus,

there is no motivation or suggestion to combine these references, as noted above. The addition of the fuel computer of Omarsson does not cure this deficiency.

In the foregoing, it is respectfully suggested that the references of Kopa, Wisman, Omarsson and Smith are an improper combination for this rejection. Accordingly, is respectfully requested that this rejection be withdrawn.

Dependent claims 28-30 are rejected over the references of Kopa, Wisman, Omarsson, Smith, the reference of Gagnon provided for its use of a fuel heater. Claims 28-30 incorporate all the features of claims 24-27, claim 28 adding the feature of "a fuel heater for heating said liquid fuel", claim 29 adding the feature of "wherein said fuel heater is operated intermittently", and claim 30 adding the feature "wherein said fuel heater is operated continuously". As noted above, the reference to Gagnon heats a mist of fuel droplets "so as to vaporized a mixture fully and completely by exhaust gases of the engine, prior to the fuel and air gas entering the cylinders of the automobile engine" (abstract). Further, as the carburetor of Kopa, as noted above completely vaporizes the fuel droplets in the carburetor, the addition of the heater of Gagnon would serve no functional purpose with respect to further vaporization of fuel droplets. Further, the object of completely vaporizing fuel droplets is contrary to Applicant's claims of "processing said metered qualities of said liquid fuel into a fog of liquid fuel droplets of a maximum predetermined

size, said fog of liquid fuel droplets provided to said induction airflow". As such, the addition of the heater of Gagnon serves no functional purpose with respect to the device of Kopa and the other cited art.

In view of foregoing, it is respectfully submitted that for purposes of this rejection, the combination of the references of Kopa, Wisman, Omarsson, Smith and Gagnon is an improper combination. Accordingly, it is respectfully requested that this rejection be withdrawn.

CONCLUSION


None of the cited art with respect to this application teaches, in any way, shape or form, the deliberate provision of delivering liquid fuel in the form of "a fog of fuel droplets", or apparatus for developing "a fog of fuel droplets". Rather, all of the art highly suggests desirability of completely evaporating fuel prior to burning. The structure of all the prior art is directed to this end. As a result, is respectfully submitted that a *prima facie* case for obviousness has not been made.

Amendments to the claims are only in accordance with corrective suggestions by the Examiner. New art has recently surfaced in conjunction with prosecution in foreign countries. Such new art is submitted herein in an information disclosure statement. Where such art is a former reference or non-U.S. patent material, copies are provided. A check in the amount of \$180.00 is provided to cover the information disclosure statement.

With respect to this new art, the Chinese reference CN 1143728 is not

"closed", has no separate tube or fog-producing device, and teaches complete evaporation of the fuel. The apparatus of Muller is an atomizer tip, with no provision to take a spray from the tip and apply it to a "fog producing device". The injector nozzle of Sinaisky effects no processing of liquid other than to pass it through a venturi, after which the liquid, still in a liquid state and not a fog, is released. The reference to Fantz teaches a burner nozzle that is not "closed", and which relies on outside air or steam to serve as a carrier gas.

As the case is believed to be in condition for allowance, favorable action is respectfully requested. It is believed the newly disclosed art will not impinge on the claims as written. If there are any outstanding issues to be resolved, a telephone call is solicited.

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